EDIBLE FISH POWDER FROM DHOMA (*Sciaenids* Spp.)

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Edible fish powder of high protein content was prepared from Dhoma (*Sciaenids*) using different methods. A comparative account of the yield and quality of the products prepared by these methods is presented.

INTRODUCTION

Sciaenids spp., locally known as dhoma, is a very important fishery along the Gujarat coast. In recent years, there has been a remarkable increase in the landings of these species as a result of increased trawling activities along this coast. There are atleast ten different related species. Of these *Otolithus ruber*, and *Otolithus argenteus* are the most important ones. Table I shows the landings of *Sciaenids* spp. in Gujarat as against the total landings in India, during the period 1970-'75.

Inspite of the heavy landings, dhoma is at present fetching only a very poor return to the fishermen. It has been observed that the fish spoils fast, presumably due to the presence of powerful autolytic enzymes. As the fishermen at present do not take care to preserve the fish in ice onboard, there is considerable deterioration in the quality of fish rendering it suitable only for making cheap quality poultry feed. Only the large sized fish are salted and sundried in the split open condition, locally known as 'phalsa'. Rest is going for fishmeal production.

This laboratory has been trying to develop suitable methods for the better utilization of this important fishery of this coast. Dhoma meat, having a proximate composition of moisture 72-77%, protein 18-21%, fat 2-5%, ash 2-3%, has been found ideal for producing good quality edible fish powder. Considering the huge landings, availability throughout the fishing season and the low cost, dhoma is the most ideally suited raw material for the commercial scale preparation of edible fish powder of high nutritive value.

Several attempts have been made in the past in India to prepare edible fish flour (Pillai, 1954, 1957; Bhatia *et al.* 1959; Moorjani and Lahiri, 1961; Moorjani *et al.* 1962; Kadkol and Lahiri, 1962; Ravankar, Bhabade and Suryanarayana Rao, 1965; Ismail, Madhavan and Pillai, 1968). But these attempts mostly involved

solvent extraction to remove fat completely thereby making the process costly. On account of its relatively low fat content dhoma could be advantageously used for the production of good quality edible fish powder, without resorting to solvent extraction. Attempts were therefore made to prepare edible fish powder from dhoma by different methods. The products prepared by these methods were compared with products prepared by solvent extraction.

Materials And Methods

Fresh dhoma (*Otolithus argenteus*) of medium size (about 20-23 cm. in length and about 100-150 g. in weight) collected from the Research Centre's trawler was washed well and kept in crushed ice overnight. Edible fish powder was prepared by different methods as follows:

1. Whole cleaned fish was thoroughly minced in a meat mincer and the minced meat dried in a tunnel dryer to a moisture level of below 10%. The dried meat was powdered and sieved to give a fine powder.

2. Whole fish was cooked in steam at 1.05 kg./cm^2 for 15 minutes. The cooked meat was minced, dried, powdered and sieved as above.

3. Boneless, skin on, but scaled, fillets were minced, dried, powdered and sieved as in 1.

4. Minced meat of fillets (boneless) was suspended in twice the quantity (w/v) of water containing 0.5% glacial acetic acid (on the weight of the meat v/w) and the slurry heated to 80°C. After maintaining at 80°C for 30 minutes with constant stirring the slurry was press filtered. The press cake was dried, powdered and sieved to give a fine powder.

5. Using minced whole fish meat press cake was prepared as in (4) and it was further defatted by extraction with iso-propanol as described by Power (1962). The defatted material was then dried, powdered and sieved to get a fine powder.

6. Powder was prepared as in (5) from boneless fillets of the fish also.

All the samples were analysed for moisture, protein, fat, ash, calcium and phosphorus contents, according to the methods of A.O.A.C (1960).

Results And Discussion

The yields and analytical characteristics of the products prepared by the different methods are presented in Table II. All the analytical results are expressed on a moisture free basis.

Method (1) gives the highest yield (17-5%) of powder, closely followed by process (2), with 17% yield. In methods using fillets the final yield was always below 10%. Steam cooking was not found to give any added advantage. More over on cooking, dhoma muscle showed a tendency to become a jelly and the final product was slightly yellowish brown also. Ash content was also slightly higher.

Samples 3 and 4, prepared from fillets had high protein contents. Fat content

TABLE I

ANNUAL LANDINGS OF *SCIAENIDS*
(In tonnes)

Year	In India	In Gujarat
1970	41903	3989
1971	36903	3433
1972	40159	3806
1973	87682	40324
1974	79261	24275
1975	114535	45781

was appreciably low. Due to absence of bones, ash (and therefore calcium and phosphorus), also showed low level in these products. But a slight fishy smell persisted. Since fat is highest in the skin of the fish, it has been observed that if the skin is removed, a powder with much lower fat content could be prepared. But this may reduce the final yield still further.

Powder prepared from defatted whole fish press cake (sample 5) was not found to be very much superior to samples 3 and 4, though the fat content was lower. Its protein value was lower and it had a higher ash content.

Fish powder prepared from defatted minced fillet (6) was found to give an excellent powder superior to all others, with respect to its protein value, appearance and odour. But the final yield is lowest and the process is rather costly.

If the powder is not meant for long storage, solvent extraction is not absolutely essential. As a cheap protein supplement to combant the protein malnutrition problem, non-defatted edible dhoma powder itself can be used. However, for an absolutely odourless and superior quality powder, defatting is necessary. Food items prepared using wheat flour incorporated with the non-defatted powder at 8% level had only mild fish flavour.

Assessing the characteristics of the end product prepared by the different methods it can be mentioned that the choice of method for the production of dhoma fish powder can be made in accordance with the subsequent use of the product as also the storage time expected of the product.

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TABLE II

ANALYTICAL CHARACTERISTICS OF DHOMA POWDER SAMPLES PREPARED BY DIFFERENT METHODS

All values expressed as percentage on a moisture free basis.

No.	Details of sample	Yield	Protein	Fat	Ash	Phosphorus as P_2O_5	Ca as CaO	Physical observation
1.	Whole fish paste dried and powdered as such	17.5%	80.21	6.359	12.99	3.005	4.686	Brownish powder with fishy smell
2.	Steam cooked whole fish, pressed, dried and powdered	17%	75.80	7.144	15.12	6.346	5.902	Yellowish brown powder with sligh fishy smell
3.	Fillets minced, dried and powdered as such.	9.9%	91.60	3.185	4.724	1.091	1.522	Brownish white powder with fishy smell
4.	Minced fillets cooked in water containing acetic acid, pressed, dried and powdered	7.3%	91.89	3.243	4.742	0.6606	0.9326	Yellowish powder with a faint fishy odour
5.	Defatted whole fish presscake dried and powdered	12%	83.47	2.863	13.14	5.78	6.401	Pale brownish white powder without any fishy smell
6.	Defatted fillets presscake dried and powdered	7%	94.26	0.5593	4.561	0.822	0.8061	Milky white powder with no smell of fish

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